ARIZONA DEPARTMENT
OF
ENVIRONMENTAL QUALITY

Douglas A. Ducey
Governor

Misael Cabrera
Director

April 24, 2018

Alexis Strauss
Acting Regional Administrator
US EPA Region 9
75 Hawthorne Street
San Francisco, California 94105

Enrique Manzanilla
Director, Superfund Division
US EPA Region 9
75 Hawthorne Street, California 94105

Re: Expansion of the Motorola 52nd Street Superfund Site Boundary

Dear Ms. Strauss and Mr. Manzanilla:

The Arizona Department of Environmental Quality (ADEQ) is requesting that the United States Environmental Protection Agency (EPA) evaluate expanding the western boundary of the Motorola 52nd Street Superfund (M52) Site to include certain portions of the West Van Buren Water Quality Assurance Revolving Fund (WQARF) Site. This request is based upon technical data collected by both EPA and ADEQ that shows Volatile Organic Compounds (VOCs) resulting from releases at the Motorola facility extend beyond the current M52 Study Area/West Van Buren WQARF boundary, in concentrations exceeding Maximum Contaminant Levels (MCLs). Arizona believes it may be more appropriate for EPA to include those specific areas within the boundary of the federal Superfund site. ADEQ believes its request to evaluate the expansion the M52 Site boundary is not only consistent with EPA's authority and precedence of expanding geographic boundaries based on additional study and evidence indicating the migration of source contamination, but this expansion was contemplated to occur by both EPA and ADEQ as the contamination for M52 was evaluated over time.

ADEQ believes that EPA's evaluation will show that:

- Pollutants from the Motorola facility within the M52 Site have migrated to the West Van Buren WQARF Site;
- Many public records document that pollutants from the Motorola facility and the M52 Site have migrated to the West Van Buren WQARF Site; and that
- EPA has strong legal basis to expand the western boundary of the M52 Site.

Scope of Evaluation Request

ADEQ is requesting that EPA evaluate the expansion of the M52 Site only to include plume areas where M52 Site contamination has migrated beyond the M52 Operable Unit 3(OU3) Study Area into the West Van Buren WQARF Site (Figure 1). ADEQ recognizes that there are portions of the current West Van Buren WQARF Site that are not directly connected to the M52 Site, but are part of the WQARF Site. ADEQ's request is specifically limited to those portions of the current West Van Buren WQARF Site where there is evidence indicating the presence of contamination connected to the Motorola facility and the M52 Site. Accordingly, ADEQ would retain jurisdiction of those portions of the current West Van Buren Site that cannot be specifically traced back to the M52 Site.

Migration from the Motorola Facility

According to site documents[1], after the Motorola facility was constructed in 1956, pure liquid chemicals started to be released from the facility. According to the OU2 Record of Decision (ROD), the majority of the release (an estimated 116,000 gallons) occurred between 1956 and 1983 and was trichloroethene (TCE). This is enough TCE to pollute groundwater above the maximum contaminant level (MCL) of 5 micrograms per liter across an area of over 10,000 square miles[2]. The M52 Site plus the proposed expansion has an area of 10.4 square miles (Figure 1). In other words, more than sufficient mass was reportedly released from the Motorola facility to account for the existing plume configuration that extends into the West Van Buren WQARF Site. Similarly, enough TCE was reportedly released from the Motorola facility to yield a concentration of 500 micrograms per liter of TCE across the entire 10.4 square mile area of the M52 Site plus the proposed expansion[3]. While these calculations are admittedly rough estimates, they definitively illustrate an important point: the reported mass released from the Motorola facility is more than sufficient to account for TCE concentrations observed throughout the M52 Site and the proposed expansion area.

In addition, an evaluation of the M52 and West Van Buren Site data shows that the TCE plume extends unbroken from the Motorola facility to approximately 69th Avenue (Figure 2). TCE from the Motorola facility was detected in the area now called OU3 in as early as 1983. In 1983, when according to documents[1] from the Motorola facility the release was thought to cease, calculations[4] show that the M52 Site TCE plume was already past I-17 and Jefferson Street. This is documented by sample results from the former East Washington Area in 1983-84, and from Roosevelt Irrigation District (RID) well sampling in 1986-87 (Figure 2). Therefore, any TCE contamination in OU3 can be attributed, at least in part, to the Motorola facility. Given the westerly groundwater flow

[1] e.g. ADEQ, 1994 Record of Decision, Operable Unit Two, East Phoenix Groundwater Containment, Motorola 52nd Street Superfund Site; Burnell et. al, 2008. Stochastic Model to Estimate Travel Times From the 52nd Street Facility in Phoenix, AZ, presented 2008 Meeting of the American Institute of Professional Geologists, Arizona Hydrological Society

[2] Assumes an average aquifer thickness of 50 feet

[3] Assumes an average aquifer thickness of 50 feet and an average porosity of 30%

regime and aquifer properties along the Salt River, this contamination would have migrated well into the West Van Buren Site in the intervening 35 years[4].

A tetrachloroethene (PCE) plume also extends unbroken over the same area, until the OU1 and OU2 extraction systems came into full effect (Figure 3). Other PCE sources exist within and adjacent to the main West Van Buren plume area; where these potential source areas can be separated from the main plume area, they are excluded from the requested site boundary expansion (Figure 1).

The TCE/PCE ratios also indicate that the contaminants from the original Motorola facility have extended into West Van Buren, as the ratios are unchanged from the Motorola facility until approximately 35th Avenue (Figure 4). At this area, PCE, likely from the 11th Avenue and Hilton Avenue source to the south, changes the ratio of the main plume. While the ratios past approximately 43rd Avenue change to be predominantly PCE due to other sources, there is still no break in the TCE plume, indicating that the TCE as far as 69th Avenue is potentially coming from the Motorola facility source.

Documented Migration from the M52 Site to the West Van Buren WQARF Site

The M52 Site was placed on the National Priorities List (NPL) in 1989. However, groundwater contamination was first discovered in central Phoenix when VOCs were detected in the Eastlake Park well located near the intersection of 16th Street and Jefferson in 1983, six years before the M52 Site was placed on the NPL. The following excerpts from key documents demonstrate that the requested expansion has been contemplated by both EPA and ADEQ as the contamination for M52 was evaluated over time.

- *Record of Decision for Motorola 52nd Street OU2*, written by ADEQ and approved by EPA in 1994 states that "Figure 2 shows the current known extent of trichloroethylene (TCE) contamination. As the figure indicates, the western edge of the contaminant plume has not yet been identified, but extends well beyond 7th Avenue." The ROD goes on to say that "The contamination extends beyond the East Washington area and into the West Van Buren WQARF area, to approximately 75th Avenue."

- EPA *correspondence to ADEQ* (November 26, 1997) stating that "Since the Record of Decision for Operable Unit (OU) 2 was signed in July 1994, we have been discussing the appropriate course of action for addressing groundwater contamination from the Motorola 52nd Street site which extends beyond the anticipated capture zone of OU2." EPA continues to say "If investigations of this area indicate that groundwater contamination from the Motorola 52nd Street facility site extends further, then the OU3 study area would be expanded accordingly."

[4] Using Ogata and Banks 1961, Ogata 1970, 1-D analytic solution of the advection-dispersion equation. Assumes site average v = 0.3 ft/d (averaged from multiple site models), site average D = 4650 ft/d (calibrated from 1-D equation using known concentrations/distances), t = 98055 days (1956 – 1983), C = 5 µg/L (edge of plume), C0 = 4,100,000 µg/L (measured Motorola facility concentration reported in OU2 1994 ROD)

- Shaw Environmental's *Final Groundwater Investigation Report, Phase I and II Well Installation for OU3* (January, 2005) prepared for EPA, documents the OU3 history and states "The OU2 Study Area comingled plume enters the OU3 Study Area and extends further west beyond the OU3 boundary into the West Van Buren WQARF site." The report continues and states that additional investigation is needed near the OU3 boundary because the Shallow and Intermediate Zone plumes continue into the West Van Buren WQARF site.

- Shaw Environmental's *Memorandum to EPA* (May 22, 2007) states "The existence of chlorobenzene in OU3, as shown in Figure 1, is strong evidence for the migration of contaminants originating at the Motorola facility in OU1, migrating through OU2, and into OU3."

- CH2M's *correspondence to EPA* (March 31, 2017) responded to comments on the Final OU3 Feasibility Study Technical Memorandum. EPA's Remedial Action Objective (RAO) 2 stated "Capture the migration of groundwater containing COCs above the EPA's Maximum Contaminant Levels, past a location west of 7th Avenue."

- CH2M's *OU3 Feasibility Study Technical Memorandum* (March, 2017) shows on Figures 3 through 6 the placement of conceptual groundwater treatment systems that include hydraulic containment into the West Van Buren WQARF site at 15th Avenue.

- EPA's *correspondence to Arizona Public Service Company and Honeywell International, Inc.* (July 5, 2017) which states that Remedial Action Alternative 2 should be revised to "Contain and capture groundwater containing contaminants of concern (COCs) exceeding maximum contaminant levels (MCLs) at a compliance point west of 7th Avenue."

- CH2M's *September 2017 Annual Groundwater Monitoring Report for OU3* (December, 2017), prepared for the M52 OU3 Working Group, continues to provide figures that show elevated concentrations of TCE west, beyond the capture zone of the OU2 treatment system moving through the OU3 Study Area and into the West Van Buren WQARF site.

- Dames & Moore's *Final Remedy Remedial Investigation Report for the Motorola 52nd Street site* (February, 1992) prepared for Motorola Inc., details the results of their investigation up to that point. Figure 7.1 of that report shows a well, west of the Grand Canal at 2246 East Washington Street with elevated VOC concentrations detected in August 1989. The well, located near the current location of the OU2 treatment system, had a total ethylene concentration of 17,100 µg/L in June of 1989, nine years before the OU2 groundwater treatment system became operational. In the ensuing 29 years, calculations show this could have migrated as far as 43rd Avenue.

- *Eastlake Park Site Inspection Report* (August, 1985) written by the Arizona Department of Health Services (ADHS) documented the presence of TCE contamination in the Eastlake Park well (44 µg/L) at 16th Street and Jefferson and in the Security Center well (202 µg/L) at 7th Avenue and Van Buren in 1984. Based on this analytical data, M52 Site

contamination was already detected at 7th Avenue in September 1984, 13 years before the M52 OU3 Study Area boundary was established.

Legal Basis for Expansion of the Site Boundary

EPA is authorized under CERCLA to expand the boundaries of NPL sites when necessary and appropriate. As such, it may be more appropriate for EPA to include those portions of the West Van Buren WQARF plume within the M52 NPL Site, rather than for Arizona to try to address the contamination under the WQARF program.

As you are aware, EPA often does not, and in some cases cannot, at the time of initially identifying, scoring and listing an NPL site, describe the full extent of contamination and set a specific geographic boundary. While a site boundary may be identified, as more information is obtained with further study of the area, the EPA expands the boundary of a site to include all areas where the contamination has migrated and come to be located. Under CERCLA §101(9) a "facility" is defined as "(A) any building, structure, …well, pit, pond, or (B) ***any site or area where a hazardous substance has*** been deposited, stored disposal of, or placed, or otherwise ***come to be located***." 42 U.S.C.A. § 9601(9)

In fact, EPA, as a matter of policy, has historically recognized that as additional information becomes available it can be necessary to enlarge the boundary of a site because of the scope of contamination is wider than originally expected. *See Mead Corp. v. Browner*, 100 F.3rd 152, 156 (1996); and *Washington State Dept. of Transp. V. U.S.E.P.A.*, 917 F.2d 1309, 1310 (1990) (recognizing EPA policy on not specifying precise boundaries in designating NPL sites). EPA has recognized its "authority to clean up contamination when is has spread from the original source." *See 1989 Final Update to National Priorities List for Uncontrolled Hazardous Waste Sites*, 54 Fed. Reg. 13296, 13298 (1989). EPA has most recently noted this policy in January 2018, stating that "[T]he NPL does not describe releases in precise geographic terms" and that "known boundaries of the contamination can be expected to change over time." *See 2018 National Priorities List Final Rule*, 83 Fed. Reg. 2549, 2550-51 (2018). Clearly, the courts have recognized and approved of EPA's ability to expand boundaries when additional information reveals a wider scope or spread of contamination. *See Mead Corp.*100 F.3rd at 156; *see also Washington State Dept. of Transp*. 917 F.2d at 1312, footnote 1. Therefore, it is appropriate for EPA to expand a NPL site boundary when technical data further identities areas where contamination has migrated and come to be located.

ADEQ's review of the technical data indicates that contamination from the Motorola facility is now located within portions of the current West Van Buren WQARF site. ADEQ is requesting that EPA evaluate expanding the boundary, consistent with EPA policy and established case law, to include all the known areas where the contamination has come to be located. ADEQ and EPA documents and technical data support a conclusion that the M52 TCE/PCE plume has migrated from the original Motorola facility to a point beyond the western border of the M52 Site and into the West Van Buren WQARF Site. While other sources of contamination are also located within the area, ADEQ has found multiple lines of evidence to establish that the TCE contamination in the proposed expansion area relates, at least in part, back to the Motorola facility.

This situation is distinguishable from circumstances where several sites located in geographic proximity may have been aggregated into a larger NPL site. Here, the portions of the West Van Buren site ADEQ is requesting be evaluated for inclusion within the expanded NPL M52 site are related to contamination from the releases at the original M52 facility (Motorola). This is not a case of expanding boundaries to include sites not previously connected with the NPL site. In fact, if EPA expands the boundary of the M52 NPL Site, ADEQ will re-designate the remaining portions of the West Van Buren plume and retain jurisdiction of those areas under the WQARF program (*See* Figure 1, Proposed Expanded NPL Site). This will assure that EPA's expansion of the NPL Site only covers areas of known contamination that has spread from the Motorola facility and does not include areas that should be appropriately administered under the state's WQARF program.

While it may be possible for EPA to evaluate the portions of the West Van Buren plume that are connected to the releases from the Motorola facility for a separate NPL listing, ADEQ believes it is more consistent with EPA's approach for expanding NPL sites to include areas where contamination has spread to expand the boundary of the NPL site to the west, rather than pursue an entirely separate NPL listing. In fact, in its November 26, 1997 letter to ADEQ, the EPA specifically recognized that the contamination originating at the M52 site was likely to have migrated beyond the projected OU2 study area. The EPA recognized that if further investigations found that groundwater contamination extended further, then the OU3 study area would be expanded accordingly.

Moreover, expansion of the M52 NPL Site westward likely would not require separate rulemaking, as may be needed if a new NPL listing is pursued. Finally, it may be administratively more effective for EPA to manage the remediation of the expanded areas of contamination in conjunction with its oversight of the M52 OU1, OU2 and OU3 plumes.

As a result, it is appropriate for EPA, as part of its authority under CERCLA in designating NPL site boundaries, to evaluate the expansion the M52 Site boundary to include the portions of the West Van Buren plume that originated from and are related to the M52 facility.

Conclusion

The documents and data support a TCE/PCE plume that migrated from the original Motorola facility to a point well beyond the western boundary of the M52 Site and into the West Van Buren WQARF Site. As of today, calculations and observed concentrations show that the TCE contamination within the West Van Buren WQARF Site at 69th Avenue are, at least in part, from the Motorola facility within the M52 Site. The pollutants are the same and the plume is unbroken. While other sources have also joined the plume, multiple lines of evidence show that the extent of TCE contamination is due to, at least in part, to the Motorola facility and the M52 Site.

EPA's authority to expand the current boundary from OU3 westward to include specific areas of contamination traceable to the M52 Site is consistent with EPA's historic approach to expansion of geographic boundaries for NPL sites. Moreover, the record for the M52 Site indicates that EPA anticipated that expansion of the boundary would likely occur over time. The boundary of the

M52 Site should be evaluated for extension westward to include plume areas where M52 Site contamination has migrated beyond the OU3 Study Area into the West Van Buren WQARF Site.

ADEQ appreciates EPA's consideration of this request. If EPA determines that expanding the boundary of the M52 NPL Site is not in its best interests, ADEQ requests that EPA evaluate the West Van Buren WQARF site for a separate NPL listing. ADEQ understands there are key elements when scoring a site and asks that EPA take into account that at least one privately owned well used for domestic purposes was abandoned due to contamination in the West Van Buren WQARF Site. Another important factor is that all aquifers in Arizona are classified as "drinking water protected use", pursuant to Arizona Revised Statutes §49-224.B. These are important factors to consider when moving through the EPA scoring model.

ADEQ looks forward to discussing this issue further with EPA. Please let me know if you have any questions.

Respectfully,

Misael Cabrera, P.E.
Director

Attachments:

Figure 1 – Proposed Expanded NPL Site
Figure 2 – TCE Time Series 1984 - 2017
Figure 3 – PCE Time Series 1984 - 2017
Figure 4 – TCE/PCE Ratio Areas 1984 - 2017

Proposed Expanded NPL Site

N

WCP NORTH CANAL PLUME

WCP WEST OSBORN COMPLEX

ECP 32ND STREET
AND INDIAN SCHOOL ROAD

ECP 24TH STREET
AND GRAND CANAL

OU1

MOTOROLA 52ND STREET

OU2

OU3

51st Ave and Roosevelt St

1st Ave and Lincoln St

11th Ave and Hilton Ave

Proposed Expanded NPL Site

WQARF

Overlap WQARF

EPA NPL SUPERFUND

HISTORIC WEST VAN BUREN

Proposed Boundaries

Proposed WQARF Sites

Proposed Expanded NPL Site

0 0.75 1.5 3 Miles

This map is for general reference only and may not be all inclusive. ADEQ program's data collection efforts are ongoing. More detailed information and specific locations can be obtained by contacting the Arizona Department of Environmental Quality.

Figure 1

ADEQ Arizona Department of Environmental Quality

Map 18-1000

S:\gisdev\dc7\Superfund\SuperfundMotorolaEdit.mxd

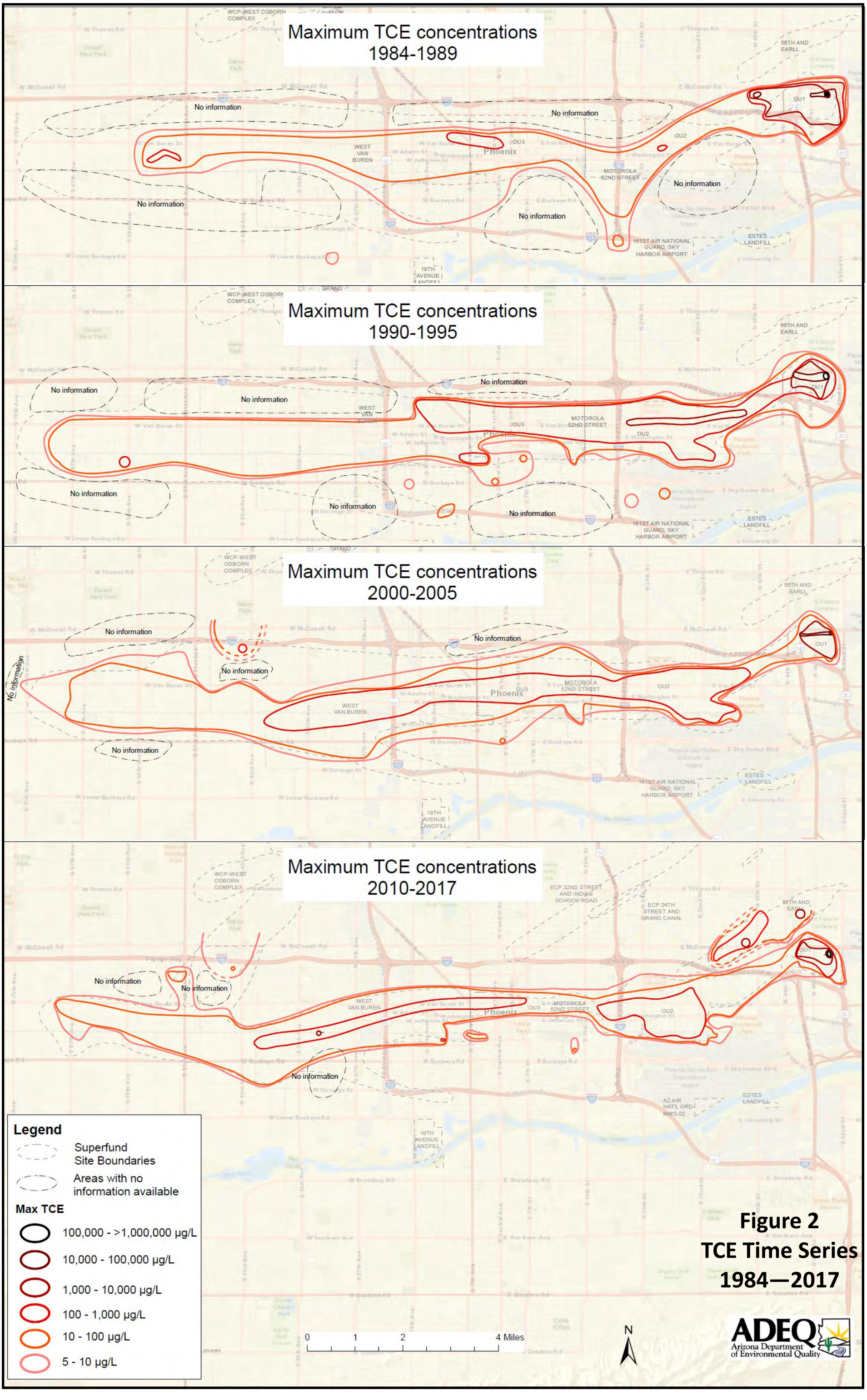

Figure 2
TCE Time Series
1984—2017

ADEQ Arizona Department of Environmental Quality

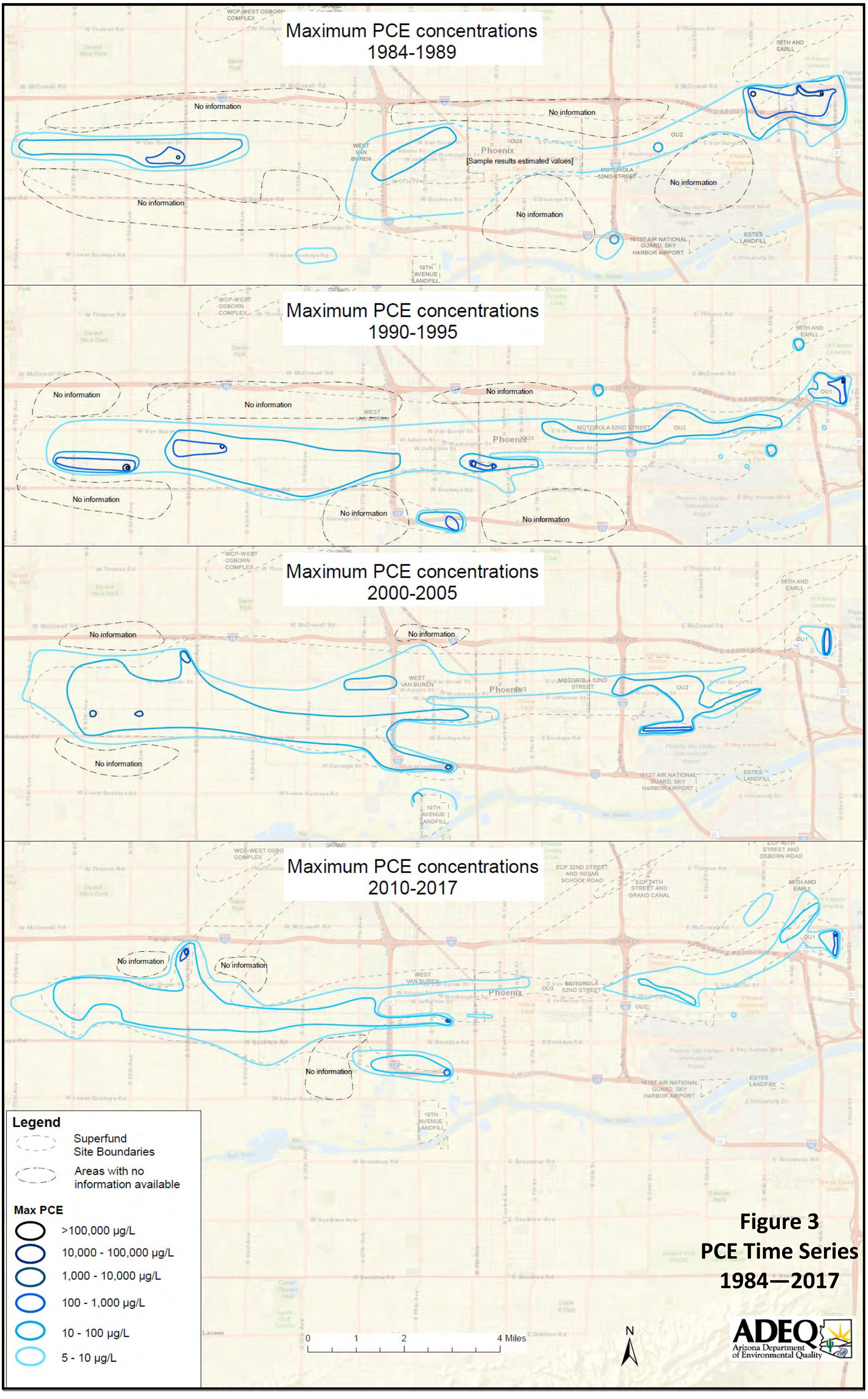

Figure 3
PCE Time Series
1984—2017

TCE/PCE Ratio Areas
1984-1989

WCP-WEST OSBORN COMPLEX
56TH AND EARLL
No information
No information
No information
No information
No information
WEST VAN BUREN
OU3
MOTOROLA 52ND STREET
OU2
Phoenix Sky Harbor International Airport
ESTES LANDFILL
161ST AIR NATIONAL GUARD, SKY HARBOR AIRPORT
19TH AVENUE LANDFILL

TCE/PCE Ratio Areas
1990-1995

WCP-WEST OSBORN COMPLEX
56TH AND EARLL
No information
No information
No information
No information
No information
No information
WEST VAN BUREN
OU3
MOTOROLA 52ND STREET
OU2
OU1
Phoenix Sky Harbor International Airport
ESTES LANDFILL
161ST AIR NATIONAL GUARD, SKY HARBOR AIRPORT
19TH

TCE/PCE Ratio Areas
2000-2005

56TH AND EARLL
WEST VAN BUREN
Phoenix
OU3
MOTOROLA 52ND STREET
OU2
OU1
Phoenix Sky Harbor International Airport
ESTES LANDFILL
161ST AIR NATIONAL GUARD, SKY HARBOR AIRPORT
19TH AVENUE LANDFILL

TCE/PCE Ratio Areas
2010-2017

PLUME
WCP WEST OSBORN COMPLEX
ECP 32ND STREET AND INDIAN SCHOOL ROAD
ECP 40TH STREET AND OSBORN ROAD
ECP 24TH STREET AND GRAND CANAL
56TH STREET AND EARLL DRIVE
WEST VAN BUREN
MOTOROLA 52ND STREET
Phoenix Sky Harbor International Airport
161ST AIR NATIONAL GUARD SKY HARBOR AIRPORT
ESTES LANDFILL
19TH AVENUE LANDFILL

Legend

- Superfund Site Boundaries
- Superfund Site Boundaries

TCE/PCE ratio area

- All TCE
- Almost all TCE (ratio >10)
- More TCE (ratio >1 - 10)
- More to all PCE (ratio <1)

0 1 2 4 Miles

N

Figure 4
TCE/PCE Ratio Areas 1984—2017

ADEQ Arizona Department of Environmental Quality